Advanced Statistics (STA 327 AB) Spring 2017

Instructor:  Fatma Abdel-Raouf, Ph.D.
Professor of Economics and Finance
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E-mail: raouff@gbc.edu
Office Hours: Monday and Wednesday 12:00 noon – 4:00 PM
Tuesday and Thursday 12:30 – 3:30 PM
Online Hours Thursday 5:00 – 9:00 PM
Students are also welcome to stop by anytime or to make an appointment for another time.

Contact Hours: 42
Credits: 3

Textbooks (optional):

Calculator:
The TI-83/84 plus or 84 Plus C or 84 Plus CE graphing calculator will be extensively used in the class.

Excel: Excel will be used extensively in the class.

Course Description:
The course introduces students to advanced topics in statistics, with an emphasis on business and non-business applications. The course covers hypothesis testing, testing the difference between two means, regression analysis, nonparametric tests, analysis of variance, and forecasting. The course focuses on building strong statistical knowledge, analytical skills, and the applications of statistical concepts to business and non-business situations and to common occurrences in daily life.
Prerequisite:
STA 326 Applied Statistics.

Learning Objectives/Goals:
1. Students will be able to formulate hypothesis testing for different situations.
2. Students will show how to test the difference between two means.
3. Students will demonstrate how to perform correlation and regression analysis.
4. Students will be able to perform analysis of variance.
5. Students will illustrate a fundamental understanding of when and how to use nonparametric statistics.

Method of Instruction:
The instructor is planning to conduct this course as following:

- **Lectures**: Fully explain the materials covered with several real world examples to clarify the materials.
- **Exercises**: Measure the students’ understanding of course content.
- **Case studies**: Applying the concepts covered in class to a real case using Excel.

Topics Covered:

1. **Review of Confidence Interval**
   - 1.1 Confidence Intervals for the Population Mean
      - 1.1.1 When sigma (σ) is known
      - 1.1.2 When sigma (σ) is unknown
   - 1.2 Confidence Intervals for the Population Proportion
   - 1.3 Determining Sample Size
   
   January 17th – 26, 2017
   (Ch 8)

2. **One-Sample Hypothesis Testing**
   - 2.1 Procedures for Hypothesis Testing
   - 2.2 Hypothesis Testing for the Population Mean
      - 2.2.1 When sigma (σ) is known
      - 2.2.2 When sigma (σ) is unknown
   - 2.3 The p-value Method
   - 2.4 Hypothesis Testing for the Population Proportion

   January 31 – February 9th
   (Ch 9)
Review for Exam I  
February 14, 2017

Exam I  
February 16, 2017

3. **Two-Sample Hypothesis Testing**  
   February 21 – March 7th
   (Ch 10)
   3.1 Hypothesis Testing for the Difference in Population Means with Independent Samples
      3.1.1 When \( \sigma_1 \) and \( \sigma_2 \) are known
      3.1.2 When \( \sigma_1 \) and \( \sigma_2 \) are unknown
         3.1.2.1 Unequal Population Variances
         3.1.2.2 Equal Population Variances
   3.2 Hypothesis Testing for the Difference in Population Means with Dependent Samples
   3.3 Using Excel for Hypothesis Testing
   3.4 Hypothesis Testing for the Difference in Population Proportions with Independent Samples

4. **Analysis of Variance (ANOVA)**  
   March 9th – 16th
   (Ch 11)
   4.1 One-Way ANOVA
   4.2 Randomized Block ANOVA
   4.3 Two-Way ANOVA

Review for Exam II  
March 21st, 2017

Exam II  
March 23rd, 2017

5. **Chi-Square Tests**  
   March 28 – 30, 2017
   (Ch 12)
   5.1 Chi-Square Goodness-of-Fit Test
   5.2 Goodness-of-Fit Test with Binomial Distribution
   5.3 Goodness-of-Fit Test with Poisson Distribution
   5.4 Chi-Square Test for Independence

6. **Correlation and Simple Linear Regression**  
   April 4th – 13, 2017
   (Ch 14)
   6.1 Correlation Analysis
   6.2 Simple Linear Regression
   6.3 Measures of Goodness-of-Fit for the Model
   6.4 Hypothesis Testing and Confidence Interval for the Estimated Coefficients
   6.5 Assumptions for the Simple Linear Regression
Course Policies

Attendance
Students are expected to attend all classes, to be in class on time, to stay in class until the end of the class, not to interrupt the class in any way, and to participate in class discussion.

Late Assignments
- All assignments are to be submitted electronically via:
  1. Campus Web or
  2. Email attachment
- All assignments are due by the end of the day Sunday following the class meeting. Late assignments are penalized by taking one point off the grade. Assignments are not accepted after the answer is already posted on Campus Web.

Make-Up Tests
- Dates for the exams I and II are subject to change depending on the materials covered.
- Makeup exam and incomplete are given in real emergency only.
- Cell phones ARE NOT to be used during exams. They should be turned off and kept in your back bag.

Method of Evaluation
- Exam I (February 16, 2017) counts for 20% of the grade.
- Exam II (March 23rd, 2017) counts for 20% of the grade.
- Final Project (April 25 – 27, 2017) counts for 20% of the grade.
- Assignments count for 20% of the grade.
- Mini Cases count for 20% of the grade.
Grading Policy

Grade for the course is based on curving the total course grades for students at the end of the semester. The grade distribution will then be compared with the College's grading scale. The student will be granted the higher of the two grades. Goldey-Beacom College grading scale is

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Getting Extra Help

Students are always welcome to stop by during my office hours for help. You can also email me anytime with any questions you have and I'll be glad to help.

Expectations

Students are expected to attend all classes, to be in class on time, to stay in class until the end of the class, not to interrupt the class in any way, and to participate in class discussion

College Policies & Resources

Academic Honor Code

This course is governed by the Academic Honor Code and the Respectful Learning Environment Policy of the College. Any violation of this policy will be penalized. The web site for the Academic Honor Code is Goldey-Beacom College Academic Honor Code (http://go.gbc.edu/honor-code). All GBC courses are governed by this policy.

Accessibility at GBC

The Financial Aid/Advisement Office serves as the first point of contact for students to discuss consideration for reasonable accommodations and as the location to provide documentation for requested accommodations, as required. Please visit the Financial Aid/Advisement Office on campus for more information.
Hirons Library & Learning Center

The Hirons Library and Learning Center (HLCC), located in the Jones Center, contains a variety resources to support your research throughout your time at Goldey-Beacom College.

- Search for information to help you complete your next class assignment using our robust discover tool (https://www.gbc.edu/academics/academic-resources/library-technology-services/), which includes over half a million full-text journal articles, eBooks, print books, and government documents. We also have individual databases (http://gbc.libguides.com/az.php) like Mergent Online and RIA Checkpoint that support specific majors such as accounting.
- Within the HLLC, the Academic Resource Center (ARC) is available to assist you with your tutoring needs. Visit the ARC website (https://www.gbc.edu/academics/academic-resources/tutoring-support.html) to learn more about the services the ARC provides.
- Computers, printers, and a scanner are available for you to use to complete assignments as well. Visit the Library and Technology Services website (https://www.gbc.edu/academics/academic-resources/library-technology-services/) for details regarding computing options and hours of operation within the HLLC.